

## REMARKS

Reconsideration of this application is respectfully requested.

### **I. Status of the Claims**

Claims 2, 17-28 were previously canceled without prejudice or disclaimer of the subject matter therein.

Claim 29 has been added and no new matter is added

Claims 1, 3-16, and 29 are pending.

### **II. Rejections under 35 U.S.C. § 103**

Claims 1, 3, 4, and 6-12 are rejected under 35 U.S.C. § 103(a) as unpatentable over Lagoze “A Secure Repository for Digital Libraries” (hereinafter “Lagoze”) in view of Kahn et al. “A Framework for Distributed Digital Object Services” (hereinafter “Kahn”) and “Managing Access to Digital Information” (hereinafter “Managing Access”). Claim 5 is rejected under 35 U.S.C. § 103(a) as unpatentable over Lagoze in view of Kahn and in further view of the Examiner’s Official Notice of ordinary skill in the art. Applicants respectfully traverse the rejections.

The Examiner states that neither Lagoze nor Kahn disclose “placing an identifier for each participant of a value chain, in the metadata” and that this element is disclosed in Managing Access. Applicants respectfully submit that Lagoze teaches away from the concept and neither Kahn nor Managing Access are enabled references and do not teach one of ordinary skill in the art how to make the invention. Both Kahn and Managing Access are, at best, academic theories describing hypothetical systems for securely transferring digital content without any information on how to implement the system.

Enclosed herewith is a Declaration from a non-inventor expert regarding the disclosure of Lagoze, Kahn, and Managing Access and stating his own view of the state of the art at the time the invention was made. In the Declaration, the expert states that it is his opinion, based on reading the documents and his knowledge of the art at the time of the publication of Lagoze, that Lagoze's architecture is silent regarding value-chain management. Lagoze only focuses on forming the library, finding references, and allowing users to access information from a specific repository. Lagoze's architecture does not contemplate a series of commercial transactions between multiple parties. Since the above is not contemplated by Lagoze, the expert considers that one of ordinary skill in the art is not taught or suggested an architecture that includes value chain management.

Further in the expert's opinion, Kahn is silent regarding value-chain management. Kahn's architecture does not contemplate series of commercial transactions between multiple parties. Since this is not contemplated by Kahn, one of ordinary skill in the art is not taught or suggested an architecture that includes value chain management.

Furthermore, the expert states that Managing Access is a White Paper that discusses both the current state of management along with concepts for future implementation. In the expert's opinion, Managing Access' discussions are not coupled with any instructions to one of ordinary skill in the art on how to implement what is discussed in the paper. The expert states that Managing Access is vague on the element of adding value-chain identifiers to the handle. The concept of value-chain management is mentioned mostly in passing and with no framework. It is the expert's opinion that Managing Access' disclosure is not sufficiently enabled to allow one of ordinary skill in the art to implement adding value-chain identifiers to a handle.

Thus, it is the expert's opinion that one of ordinary skill in the art cannot and would not combine Kahn and Lagoze with Managing Access and devise an architecture that supports value-chain management.

Thus, the combination of Lagoze, Kahn, and Managing Access do not teach or suggest to one of ordinary skill in the art an architecture that supports value-chain management as disclosed in claim 1.

Further, the expert states that Kahn, in his opinion, is not enabled to teach one of ordinary skill in the art even its base teaching. Kahn provides numerous comments and statements that the concepts he discusses have not been designed or tested. For example, comments on page 2 and pages 4 and 5 illustrate to one of ordinary skill in the art that Kahn did not enable his concepts.

Furthermore, from the description provided by Lagoze, the expert submits that in his opinion, Lagoze reinforces that Kahn's disclosure is not enabled to one of ordinary skill in the art. Lagoze specifically states that:

Researchers from the Digital Library Research Group at Cornell, the Computing and Communications Group at NCSA (University of Illinois), CNRI [Corporation for National Research Initiatives], and Xerox Corporation collaborated over the past several months to develop a design for repositories of objects in digital form, a fundamental component of digital libraries. ... Our starting point for this design is the framework articulated by Robert Kahn (CNRI) and Robert Wilensky (UC Berkeley) [4], as a result of the Advanced Research Projects Agency Computer Science Technical Report Project [5]. This work is commonly referred to as the Kahn/Wilensky architecture.

Lagoze, page 2. Lagoze states above that it took two universities, a not-for profit organization, and a major corporate entity "several months" to implement a "first stage" design of the concepts outlined by Kahn. The expert states that the creation of the basic forms of Kahn's architecture required the knowledge and expertise of institutions and personnel having skill above that of

ordinary skill. Applicants respectfully submit that Kahn is not enabled and cannot anticipate or render unpatentable claims 1 and 3-12.

Additionally, the expert considers that Managing Access is not enabled. It is the expert's opinion that since Managing Access asks numerous unanswered questions relating to the value-chain concept the authors have not enabled the disclosure. The questions, asked on pages 5-7 of Managing Access, indicate to the expert that the authors have not enabled the disclosure for one of ordinary skill. The disclosure indicates that the authors never reduced an enabled version of the concept to practice nor knew how to at the time the paper was authored.

Also, the expert states that Managing Access defines the state of the art as part of the article and the state of the art does not include identifying value-chain participants. Managing Access, on page 10, defines what was known in the art at the time Managing Access was published. The expert states that the identification of value-chain participants was not mentioned and, thus not enabled, at the time of publication of Managing Access, as described by its authors.

Applicants respectfully submit that Managing Access is not enabled and cannot anticipate or render unpatentable claims 1 and 3-12.

Thus, as argued above and in the previous response, and supported by the accompanying Declaration of expert Dmitry Radbel, there is no teaching or motivation to combine Lagoze, Kahn, and Managing Access. Additionally, neither Kahn nor Managing Access provide disclosure to enable the concepts discussed in their publications. Applicants respectfully submit that the accompanying Declaration is sufficient evidence, as requested by the Examiner, that independent claim 1 is allowable and that claims 3-12, that depend on claim 1 are also allowable.

Additionally, the expert states that Managing Access is objective evidence describing a “long felt need” in the industry that has not been satisfied. Managing Access outlines what the industry wanted and did not have. Managing Access further admits that the concept is not even in development, let alone enabled, at the time the article was written. In the expert’s opinion, Managing Access addresses numerous problems without solutions, which is evidence of “long felt need,” and some of these solutions are provided for by the present invention.

Claims 13-15 are rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 6,199,096 to Mirashrafi et al. (“Misashrafi”) in view of Discussion Paper 96. Claim 16 is rejected under 35 U.S.C. § 103(a) as obvious over Misashrafi in view of Discussion Paper 96 and further in view of U.S. Patent No. 6,161,137 to Ogdon et al. (“Ogdon”). Applicants respectfully traverse the rejections. The Examiner contends that Mirashrafi discloses a system that synchronizes the rendition of the media object at the second location with the rendition of the media object at the first location. The Examiner further contends that this is disclosed on column 4, lines 29-30.

Applicants respectfully disagree with the Examiner’s reading of Mirashrafi. Mirashrafi discloses an apparatus to allow multiple systems to receive the same data in “series,” i.e. one after the other in succession. Mirashrafi’s system relies on a specific central bridgeport hardware system that detects a URL from the first user. The URL is passed up to the bridgeport and then forwarded to the other users on the system. *See*, Mirashrafi, column 4, lines 7-37. The first user displays the web page first as the URL is passed to the bridgeport. The bridgeport then passes the URL to the remaining users and the systems local to the remaining users must retrieve and display the web page. Thus, the first user system displays the web page, then after that a second user system will

display the web page, and a third user system can display it after both the first and second user systems. All of the successive delays in the display are given by the speed of the individual system and its connection to the network. Mirashrafi himself, at column 4, lines 32-38, admits that his system has a lag and not all users receive the web page at the same time. Applicants further submit that the use of the term “synchronize” in claim 13 is consistent with the dictionary definition and Mirashrafi, by his own admission above, is not consistent.

Further, the expert has stated his opinion that Mirashrafi’s use of the term “synchronization” for the timing of the displaying of the web pages linked to the URLs is a misnomer. Mirashrafi’s system can only display the web pages one after the other in succession and not at the same time. Further, the experts states that that it is impossible to truly synchronize content using Mirashrafi’s arrangement due to the inherent delays at every transmission and receiving step required by Mirashrafi’s invention.

Thus, Mirashrafi does not disclose or suggest the synchronization step of claim 13. Additionally, Odgen does not teach or suggest the elements missing from Mirashrafi and the combination of the references cannot anticipate the claim. Further, claims 14-16 depend on claim 13 and are allowable based on the same reasoning above. Applicants respectfully submit that the accompanying Declaration is sufficient evidence, as requested by the Examiner, that claims 13-16 and 29 are allowable and request that the rejection be withdrawn.

**CONCLUSION**

In view of the above amendments and remarks, it is respectfully requested that the application be reconsidered and that all pending claims be allowed. Accordingly, the Examiner is respectfully requested to pass this application to issue.

The Examiner is respectfully requested to contact the undersigned at the telephone number indicated below once he has reviewed the proposed amendment if the Examiner believes any issue can be resolved through either a Supplemental Response or an Examiner's Amendment.

Dated: March 21, 2006

Respectfully submitted,

By   
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Docket No.: 09386/100F215-US1  
(PATENT)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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In re Patent Application of:  
Albhy Galuten

Application No.: 09/486,759

Confirmation No.: 4604

Filed: June 8, 2000

Art Unit: 2154

For: METHOD AND SYSTEM FOR  
TRANSMITTING MEDIA INFORMATION  
THROUGH A NETWORK

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Examiner: L. D. Donaghue

**DECLARATION BY EXPERT DMITRY RADBEL UNDER 37 C.F.R. 1.132**

MS After-Final Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

I, Dmitry Radbel, hereby declare:

1. I am a citizen of the United States and I am over 21 years old.
  
2. I am an expert in the technology disclosed in the above-captioned patent application and submit this declaration in support of the patentability of pending claims 1 and 3-16.
  
3. I am currently employed by the assignee of the above-captioned patent application,

Universal Music Group.

4. I have over 20 years of experience in the field of internet, cable and broadcast systems, digital content delivery, content security and digital rights management. Details of my background and experience are disclosed in my Curriculum Vitae, attached as Exhibit A. My relevant experience in digital content delivery technology and digital rights management is as follows.
  - a. I received a Bachelors of Science in Electrical Engineering from St. Petersburg Institute of Telecommunications, St. Petersburg, Russia in 1978 and a Master of Science in Electrical Engineering from University of Washington in 1983. Further, I received Master of Business Administration from UCLA Anderson Graduate School of Management in 1992.
  - b. From 1983-1991, I held technical positions with Bell Communications Research, Hughes Communications, and LinCom Corporation. I evaluated, managed planned communication networks and services. I planned communication and information infrastructure for the NASA Space Station. Provided systems engineering support to NASA on the Space Shuttle program and other advanced communication systems studies.
  - c. From 1992-1995, I was director of business development for DirecTV. Part of my

responsibilities was to lead a cross-functional design team responsible for system architecture and operations. I was in charge of pre-launch system integration and readiness assessment and help design the telecommunications infrastructure.

- d. From 1995-1997, I was Vice President of project management for Tele-TV. Tele-TV was a media and technology company formed by Bell Atlantic, NYNEX, Pacific Telesis, and Creative Artists Agency. The company set out to design a set-top-box that would allow customers to view video on demand over copper phone wire. I was involved with technology pertaining to broadcast systems, digital content delivery, content security and digital rights management.
- e. In 2000, I was Chief Technology Officer of Massive Media Group. I managed planning and software and systems development for a start-up provider of secure digital content distribution and commerce.
- f. From 1998-2000 and 2001-present, I worked for Universal Music Group. I am currently the Vice President of advanced technology for Universal Music Group. I manage technology strategies for electronic content distribution and development of content protection initiatives.
- g. I have published 2 articles relating to transmission and communications systems. I

am the inventor on three pending U.S. patent applications related to secure online digital music distribution applications, digital content delivery, content security and digital rights management. The three pending applications are assigned to Universal Music Group.

5. I have read and am familiar with the instant application as it was filed in the U.S. Patent and Trademark Office (hereinafter the "USPTO"), and the claims of the application as currently amended.
6. On information and belief, the Examiner has rejected the claims as follows:
  - a. The Examiner has rejected claims 1, 3, 4 and 6-12 on the grounds that they are unpatentable over Lagoze "A Secure Repository for Digital Libraries" (hereinafter "Lagoze") in view of Kanh et al. – "A Framework for Distributed Digital Object Services" (hereinafter "Kahn") and "Managing Access to Digital Information" (hereinafter "Managing Access"). Claim 5 is rejected as unpatentable over Lagoze in view of Kanh and Managing Access and further in view of the Examiner's Official Notice of ordinary skill in the art. On information and belief, the Examiner has concluded that Lagoze discloses all of the elements of the present invention but does not teach identifying one value chain participant and that Kahn teaches this element. Further, on information and belief, the Examiner contends that Managing Access discloses obtaining an identifier for the media object and forming a handle.

b. The Examiner has rejected claims 13-15 on the grounds that they are unpatentable over U.S. Patent No. 6,199,096 to Mirashrafi et al. (“Misashrafi”) in view of Discussion Paper 96. Claim 16 is rejected on the grounds that it is obvious over Misashrafi in view of Discussion Paper 96 and further in view of U.S. Patent No. 6,161,137 to Ogdon et al. (“Ogdon”). On information and belief, the Examiner has concluded that Mirashrafi discloses the synchronization of content between two locations but does not discloses a handle as an identifier. The Examiner further contends that Discussion Paper 96 discloses a Universal Resource Name (URN) that is a handle.

7. Regarding Lagoze, he discloses finding items in a repository, in essence, how to form a digital library. Lagoze discusses an object-based design for the repositories in a digital library infrastructure. The discussion is general, defining terms and outlining basic steps to resolve and transmit data. It is my opinion, based on reading the document and my knowledge of the art at the time of the publication of Lagoze, that Lagoze’s architecture is silent regarding value-chain management. Lagoze’s focus is only to form the library and find references. Lagoze is only considering how to allow users to access information from a specific repository. Lagoze’s architecture does not contemplate a series of commercial transactions between multiple parties. Since the above is not contemplated by Lagoze one of ordinary skill in the art is not taught or suggested an architecture that includes value chain

management.

8. Kahn's disclosure, as Lagoze's above, discloses finding items in a repository and distributing its contents. Kahn defines digital objects, how to access digital objects in a repository, and a discussion on handles. In my opinion, Kahn is silent regarding value-chain management. Kahn's architecture does not contemplate series of commercial transactions between multiple parties. Since this is not contemplated by Kahn, one of ordinary skill in the art is not taught or suggested an architecture that includes value chain management. In my opinion, one of ordinary skill in the art cannot combine Kahn and Lagoze with Managing Access (as described at point 11) and devise an architecture that supports value-chain management.
  
9. Further Kahn, in my opinion, is not enabled to teach one of ordinary skill in the art even its base teaching. Kahn provides numerous comments and statements that the concepts he discusses have not been designed or tested. For example, on page 2, Kahn begins the discussion of the paper with “[c]onceptually, the System works as follows...” and then on pages 4 and 5, Kahn adds comments for numerous functions that “[w]e leave unspecified at this point how this might be accomplished...;” “[t]he details of interaction with handle generators are left unspecified;” and “[t]he mechanism for this registration is currently unspecified.” The above language illustrates to one of ordinary skill in the art that Kahn did not enable his concepts.

10. Further proof that Kahn is not enabled comes from Lagoze. Lagoze specifically states that:

Researchers from the Digital Library Research Group at Cornell, the Computing and Communications Group at NCSA (University of Illinois), CNRI [Corporation for National Research Initiatives], and Xerox Corporation collaborated over the past several months to develop a design for repositories of objects in digital form, a fundamental component of digital libraries. ... Our starting point for this design is the framework articulated by Robert Kahn (CNRI) and Robert Wilensky (UC Berkeley) [4], as a result of the Advanced Research Projects Agency Computer Science Technical Report Project [5]. This work is commonly referred to as the Kahn/Wilensky architecture.

Lagoze, page 2. Lagoze states above that it took two universities, a not-for profit organization, and a major corporate entity “several months” to implement a “first stage” design of the concepts outlined by Kahn. In my opinion, Lagoze informs us that Kahn’s disclosure is not enabled to one of ordinary skill in the art. The creation of the basic forms of Kahn’s architecture required the knowledge and expertise of institutions and personnel having skill above that of ordinary skill.

11. Managing Access is a White Paper which discusses what may be or should be in the future of managing and transmitting digital information. Managing Access discusses both the current state of management along with concepts for future implementation. However, in my opinion, the discussions are not coupled with any instruction to one of ordinary skill in the art on how to implement what is discussed. Managing Access is vague on the element of adding value-chain identifiers to the handle. The concept of value-chain management is mentioned mostly in passing and with no framework. For example, in describing digital

objects, Managing Access states that “[t]here will probably be at least two different categories of digital objects - those that come with meaningful restrictions and those that do not. Many commercial digital objects may come without any meaningful restrictions; others may be heavily encumbered.” Managing Access, page 4 (emphasis added). It is my opinion that Managing Access’ disclosure is not sufficiently enabled to allow one of ordinary skill in the art to implement adding value-chain identifiers to a handle.

12. Further, Managing Access asks numerous unanswered questions relating to the value-chain concept. In my opinion, the questions illustrate that the authors have not enabled the disclosure. Some questions are:

How will network users be able to "borrow" or otherwise use digital objects stored in repositories? Will there be restrictions on who may access such information? ...

With respect to digital objects, how can we track who owns what and in what contexts? ...

How can information owners be adequately compensated when their works are expressed in various digital formats that may be accessed, manipulated, interpreted, and aggregated where such works are configured as digital objects? ... [and]

Will automated licensing mechanisms be developed within a network environment to facilitate access to digital objects and their contents?

Managing Access, pages, 5-7. The questions asked indicate, in my opinion, that the authors had not enabled the invention for one of ordinary skill. The disclosure indicates that the authors never reduced an enabled version of the concept to practice nor know how to at the time the paper was authored.

13. Furthermore, Managing Access defined the state of the art as part of the article and the state of the art does not include identifying value-chain participants. The listed enabled (or still being developed) portion of the disclosure is:

Current technology enables vendors to provide some or all of the following services, several of which are now under development (Bock 1996; IBM infoMarket 1995; and Sibert et al. 1995):

- linking content providers to those who want content;
- providing content or content-related services;
- acting as a repository for digital objects;
- providing abstracts and indices;
- searching content;

- employing encryption and related techniques to manage rights and interests and to ensure the integrity of digital objects and their contents;

- delivering information on disks or CD-ROMs, or providing network access via e-mail, browsers, etc.;

- keeping information protected until the digital object is opened (e.g., in order to open an object, the user must contact a clearinghouse to handle the payment); and

- operating somewhat like a bookstore (e.g., understanding content, generating abstracts, and selling digital objects to the public).

Managing Access, page 10. In my opinion, this disclosure defines what was known in the art at the time Managing Access was published. The identification of value-chain participants was not mentioned, let alone, enabled, at the time of publication of Managing Access, as described by its authors.

14. Also, Managing Access, in my opinion, is objective evidence describing a "long felt need" in the industry that has not been satisfied. Managing Access outlined what the industry wants and did not have. Managing Access further admits that the concept is not even in

development, let alone enabled, at the time the article was written. In my opinion, Managing Access addresses numerous problems without solutions and some of these solutions are provided for by the present invention.

15. Regarding Mirashrafi, he discloses an apparatus to allow multiple systems to receive the same data in “series.” Mirashrafi’s system relies on some specific central bridgeport hardware system that detects a URL from the first user that is passed up to the Bridgeport and then forwarded to the other users on the system. *See*, Mirashrafi, column 4, lines 7-37. Mirashrafi uses the term “synchronization” for the timing of the displaying of the web pages linked to the URLs, but, in my opinion, this is a misnomer. Mirashrafi’s system can only display the web pages in “series”, i.e. one after the other in succession. The first user will display the web page first as the URL is being passed to the bridgeport. The bridgeport then passes the URL to the remaining users and the systems local to the remaining users must retrieve and display the web page. Thus, the first user system displays the, then after that a second user system will display the web page, and a third user system can display it after both the first and second user systems, given the speed of the system and its connection to the network. Mirashrafi himself, at column 4, lines 32-38, admits that his system has a lag and not all users will receive the web page at the same time. It is my opinion that it is impossible to truly synchronize content using Mirashrafi’s arrangement due to the inherent delays at every transmission and receiving step required by Mirashrafi’s invention and outlined is his disclosure.

Application No.: 09/486,759  
Declaration by Expert Dmitry Radbel Under  
37 C.F.R. 1.132

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Docket No.: 09386/100F215-US1

16. I further declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true. I further declare that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both, under Section 1001 of Title 18 of the United States code, and that such willful false statements may jeopardize the validity of the instant application or of any patent issued thereupon.

Dated: March 20, 2006

Respectfully submitted,

By Dmitry Radbel  
Dmitry Radbel

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## **SUMMARY:**

- Technology strategist and manager with 20 years of experience in business and technical aspects of content industries and a track record of planning and implementing complex projects
- Ability to set business objectives and translate them into implementation. Problem-solver with proven success in taking ideas from concepts to deployment:
  - managed development and implementation of a secure music distribution system and content protection initiatives for Universal Music Group
  - at DirecTV, created the architectural blueprint, directed design of business processes and managed pre-launch service readiness assessment
  - managed development and deployment of 100+ channels digital video service for Tele-TV
- Excellent leadership, communication, motivation, presentation skills. Formulated business plans, wrote proposals, build and ran organizations, managed budgets
- Technology expertise with internet, cable and broadcast systems, digital media, digital content delivery and management, content security, digital audio and video technologies, digital rights management, information systems, electronic commerce
- Taught strategic technology management at Keller Graduate School or Management.

## **PROFESSIONAL EXPERIENCE:**

**Universal Music Group, Inc.**, Universal City / Santa Monica, CA, 1998 – 2000, 2001 - present. Vice President, Advanced Technology, 2001 - present. Manage evaluation and deployment of secure electronic content distribution technologies and content protection systems. Evaluate emerging technologies and proposed digital music distribution services. Represent UMG in standards groups dealing with digital rights management, content protection, digital home networking, electronic content distribution and commerce. Manage UMG's patents portfolio. Technology Strategy Consultant, 1998-2000. Brought in to help develop business and technology strategies for the internet age. Was a chief architect for a joint venture of UMG, Bertelsmann, AT&T and Matsushita formed to deliver content over broadband networks. Designed the architecture, created development plans and recruited and managed a 30-person team that developed UMG's first secure music distribution system.

**Massive Media Group**, Santa Monica, CA, 2000.

Chief Technology Officer. Managed planning and software and systems development for a start-up provider of secure digital content distribution and commerce. Developed strategic plans and product roadmaps. Created a staffing plan, managed a department of 34 people. Established guidelines and oversaw selection of vendors and technologies for the secure commerce platform.

**AT&T Solutions – Management Consulting Group**, El Segundo, CA, 1997 – 1998.  
Senior Manager, Media, Entertainment and Communications (ME&C) Practice. Lead consulting engagements for the ME&C clients with full responsibility for the delivery, schedule and budgets. Managed a 20-person engagement developing business operations support systems for a global wireless communications company. Developed a business plan for a telecommunications startup. In spring of 1998 survey was the highest-rated engagement manager in AT&T Solutions. *Due to “reduction in force” AT&T closed the entire El Segundo office.*

**TELE-TV Media**, Century City, CA, 1995 - 1997.

Vice President, Product Management. Headed up a 12-person group responsible for managing and coordinating product development and deployment of multi-channel video services. Oversaw launch of a 100+ channels service in two cities. Developed strategic plans and product roadmaps, negotiated with partners and vendors.

*Tele-TV was a joint venture of telephone companies which they closed in 1997.*

**DirecTV, Inc.**, El Segundo, CA, 1992 - 1995.

Director, Business Development, 1994-1995. Represented DirecTV in a joint venture in Canada. Presented policy issues to the Canadian and U.S. governments. Evaluated new business opportunities and developed business and technical plans.

Manager, Systems Engineering, 1992-1994. Led cross-functional design team responsible for defining business processes, system architecture and operations. Managed the overall architectural plan. Evaluated and negotiated contracts with vendors. Was in charge of pre-launch system integration and readiness assessment. Designed telecommunications infrastructure.

**LinCom Corp.**, Los Angeles, CA, 1988 - 1991.

Principal Engineer; Senior Systems Engineer. Planned communication and information infrastructure for the NASA Space Station. Provided systems engineering support to NASA on the Space Shuttle program and other advanced communication systems studies.

**Hughes Communications**, El Segundo, CA, 1986 - 1988.

Staff Engineer, Systems Engineering Dept. Was involved in all phases of planning of communications networks. Managed a project for a Fortune 100 client. Managed requirements, requests for proposals, vendor selection.

**Bell Communications Research, Inc.**, Red Bank, New Jersey, 1983 - 1986.

Member of Technical Staff. Provided technical support for Regional Bell Operating Companies. Performed evaluation of proposed telecommunications services.

#### **EDUCATION:**

**MBA**, Anderson Graduate School of Management at UCLA, Los Angeles, California, 1992.

**MSEE**, University of Washington, Seattle, Washington, 1983.

**BSEE**, St. Petersburg Institute of Telecommunications, St. Petersburg, Russia, 1978.